Mr. Steven Dalton
Neo Resins
3110 West State Road 28
Frankfort, Indiana 46041

Re: Exempt Construction and Operation Status,
023-12720-00023

Dear Mr. Dalton:

The application from Neo Resins received on September 18, 2000, has been reviewed. Based on the data submitted and the provisions in 326 IAC 2-1.1-3, it has been determined that the following emission unit to be located at 3110 West State Road 28, Frankfort, Indiana 46041 is classified as exempt from air pollution permit requirements:

(a) One (1) 5,600-gallon blending tank, identified as BTK-14, with VOC and HAP emissions controlled by existing catalytic oxidizer, which exhausts at stack S-1.

The following conditions shall be applicable:

(1) Pursuant to 326 IAC 5-1-2 (Opacity Limitations) except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following:

(a) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of 15 minutes (60 readings) in a 6-hour period as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuos opacity monitor in a six (6) hour period.

This existing source submitted their FESOP application (F 023-12762-00023) on October 3, 2000. The equipment being reviewed under this permit shall be incorporated in the FESOP application.

An application or notification shall be submitted in accordance with 326 IAC 2 to the Office of Air Quality (OAQ) if the source proposes to construct new emission units, modify existing emission units, or otherwise modify the source.

Sincerely,

Paul Dubenetzky, Chief
Permits Branch
Office of Air Quality

ERG/AB

cc: File - Clinton County
U.S. EPA, Region V
Air Compliance Section Inspector - Eric Courtright
Compliance Data Section - Karen Nowak
Administrative and Development - Janet Mobley
Technical Support and Modeling - Michele Boner
FESOP Application File - F 023-12762-00023

Indiana Department of Environmental Management
Office of Air Quality
Gary Department of Environmental Affairs

Technical Support Document (TSD) for an Exemption

Source Background and Description

Source Name:	Neo Resins
Source Location:	3110 West State Road 28, Frankfort, Indiana 46041
County:	Clinton
SIC Code:	2821
FESOP Permit No.:	023-12762-00023
Operation Permit Issuance Date:	Not Yet Issued
Exemption No,:	023-12720-00023
Permit Reviewer:	ERG/AB

The Office of Air Quality (OAQ) has reviewed an application from Neo Resins relating to the construction of the following emission units and pollution control devices:

One (1) 5,600-gallon blending tank, identified as BTK-14, with VOC and HAP emissions controlled by existing catalytic oxidizer, which exhausts at stack S-1.

History

On September 18, 2000, Neo Resins submitted an application to the OAQ requesting permission to add an additional blending tank to their existing plant. Neo Resins submitted a FESOP application on October 3, 2000, which is currently being reviewed by IDEM, OAQ. This will be added into the FESOP permit.

Existing Approvals

The source has been operating under previous approvals including, but not limited to, the following:

(a) CP PC(12) 1621, issued on September 24, 1986;

(b) OP 12-07-91-0137, issued on September 9, 1987;

(c) Amendment to OP 12-07-91-0137, issued on May 31, 1989;

(d) Registration, issued on June 1, 1989;

(e) Modification to OP 12-07-91-0137, issued on July 9, 1991;

(f) Exemption, issued on February 22, 1991;

(g) Notice-only-change (023-11123-00023), issued November 1999; and

(h) Exemption 023-3193-00023, issued on September 16, 1993.

Enforcement Issue

(a) Based on existing approvals, IDEM has determined that NeoResins should have submitted a Title V or FESOP application in 1996.

(b) IDEM is reviewing this matter and will take appropriate action. The source submitted a FESOP application on October 3, 2000, which is currently being reviewed by IDEM, OAQ.

Stack Summary

Stack ID	Operation	Height (feet)	Diameter (feet)	Flow Rate (acfm)	Temperature (^{0}F)
S-1	Batch Emulsion Manufacturing Facility	40	2.8	5,000	850

Recommendation

The staff recommends to the Commissioner that the construction and operation be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

A complete application for the purposes of this review was received on September 18, 2000. Additional information was received on December 15, 2000 and January 16, 2001.

Emission Calculations

The calculations submitted by the applicant have been verified and found to be accurate and correct. These calculations are provided in Appendix A of this document (pages 1 through 3) .

Potential To Emit

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as "the maximum capacity of a stationary source or emissions unit to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U. S. EPA, the department, or the appropriate local air pollution control agency."

This table reflects the PTE before controls. Control equipment is not considered federally enforceable until it has been required in a federally enforceable permit.

Pollutant	Potential To Emit (tons/year)
PM	0
PM-10	0
SO_2	0
VOC	0.52*
CO	0
NO_x	0

* The potential VOC emissions represent the maximum possible VOC emissions from the new blending tank. VOC emissions from the tank would be expected to be lower than 0.52 tons/year. Since the blending tank is one of the four tanks used to manufacture emulsions from acrylic latex polymer made in the two polymerization vessels, which are a bottleneck in the process. The addition of the new blending tank does not enable the source to increase the amount of emulsion manufactured.

(a) The potential to emit (as defined in 326 IAC 2-7-1(29)) of all criteria pollutants are less than 100 tons per year. Therefore, the source is not subject to the provisions of 326 IAC 2-7.

(b) The potential to emit (as defined in 326 IAC 2-7-1(29)) of any single HAP is less than ten (10) tons per year and the potential to emit (as defined in 326 IAC 2-7-1(29)) of a combination HAPs is less than twenty-five (25) tons per year. Therefore, the source is not subject to the provisions of 326 IAC 2-7.

(c) The potential to emit (as defined in 326 IAC 2-7-1(29)) all criteria pollutants is less than the levels listed in 326 IAC 2-1.1-3(d). Therefore, the source is subject to the provisions of 326 IAC 2-1.1-3.

Justification for Modification

This modification is being performed pursuant to 326 IAC 2-1.1-3.

County Attainment Status

This source is located in Clinton County.

Pollutant	Status
PM-10	Attainment
SO_2	Attainment
NO_2	Attainment
Ozone	Attainment
CO	Attainment
Lead	Attainment

(a) Volatile organic compounds (VOC) and oxides of nitrogen (NOx) are precursors for the formation of ozone. Therefore, VOC and NO_X emissions are considered when evaluating the rule applicability relating to the ozone standards. Clinton County has been designated as attainment or unclassifiable for ozone. Therefore, VOC and NOx emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

(b) Clinton County has been classified as attainment or unclassifiable for PM-10, SO_2, CO, and lead. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

Source Status

Existing Source PSD or Emission Offset Definition (emissions after controls, based upon 8760 hours of operation per year at rated capacity and/or as otherwise limited:

Pollutant	Emissions (tons/year)
PM	29.38
PM-10	29.38
SO_2	11.1
VOC	2.63
CO	1.84
NO_x	3.13

(a) Although this existing source is one of the 28 listed source categories, it is not a major stationary source because no attainment regulated pollutant is emitted at a rate of 100 tons per year or more.

(b) These emissions are based upon the TSD for F023-12762-00023.

Potential to Emit or Modification After Issuance

The table below summarizes the total potential to emit, reflecting all limits, of the significant emission units after controls. The control equipment is considered federally enforceable only after issuance of this permit.

	Limited Potential to Emit (tons/year)						
Process/facility	PM	PM-10	SO_2	VOC	CO	NO_X	HAPs
Blending tanks BTK-14	0	0	0	0.026	0	0	0
PSD Threshold Level	25	15	40	40	100	40	--

This modification to an existing major stationary source is not major because the emissions increase is less than the PSD significant levels. Therefore, pursuant to 326 IAC 2-2, and 40 CFR 52.21, the PSD requirements do not apply.

Part 70 Permit Determination

326 IAC 2-7 (Part 70 Permit Program)

This existing source submitted their FESOP (F-023-12762-00023) application on October 3, 2000. The equipment being reviewed under this permit shall be incorporated in the submitted FESOP application.

Federal Rule Applicability

(a) The emulsion manufacturing facility is not subject to the requirements of the New Source Performance Standard 40 CFR 60, Subpart DDD - Polymers and Resins (326 IAC 12) because this facility manufactures polystyrene in a batch process. Subpart DDD applies only to polystyrene manufacturing processes that use a continuous process.

(b) The emulsion manufacturing facility is not subject to the requirements of the National Standards for Hazardous Air Pollutants (NESHAPs), 40 CFR 63, Subpart JJJ (Group IV Polymers and Resins) because the potential emissions for the facility are less than 10 tons/year for any single HAP and less than 25 tons/year for any combination of HAPs.

(c) The emulsion manufacturing facility is not subject to the requirements of the National Standards for Hazardous Air Pollutants (NESHAPs), 40 CFR 63, Subpart U(Group I Polymers and Resins) because the potential emissions for the facility are less than 10 tons/year for any single HAP and less than 25 tons/year for any combination of HAPs.

(d) The emulsion manufacturing facility is not subject to the requirements of the National Standards for Hazardous Air Pollutants (NESHAPs), 40 CFR 63, Subpart W (Epoxy Resins and Non-Nylon Polymides) because the potential emissions for the facility are less than 10 tons/year for any single HAP and less than 25 tons/year for any combination of HAPs.

State Rule Applicability - Individual Facilities

326 IAC 5-1 (Opacity Limitations)

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following, unless otherwise stated in this permit:

(a) Opacity shall not exceed an average of forty percent (40%) any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

326 IAC 8-1-6 (New Facilities; General Reduction Requirements)

326 IAC 8-1-6 is not applicable to the new blending tank because the VOC emissions from the tank will be less than 25 tons/year.

Conclusion

The construction and operation of this blending tank shall be subject to the conditions of the attached proposed Exemption No. 023-12720-00023.

NeoResins, Frankfort Plant - Functionalized Emulsion Products Project

Description: Modification of existing acrylic emulsion production operations to produce functionalized products. Functionalized emulsions are manufactured by a post-reactor addition of a proprietary cross-linking chemical (referred to as H040) with a finished acrylic emulsion. Functionalized emulsions will be manufactured in a new 5,600-gallon blend tank (BTK-14)

Task: Calculate potential per-batch VOC emissions from the manufacture of functionalized products. Functionalized emulsions production process steps are as follows:

1. Batch transfer from reactor to BTK-14.
2. Charge water/H040 to BTK-14.
3. Nitrogen purge.
4. Reduction of H040 concentration during blending/hold time
5. Load product in finished product tanks

Steps 1 and 5 are considered to have negligible potential to emit VOC. Step 1 occurs before H040 is charged to the batch. In addition, the blend tank is VOC vapor free; therefore, no VOC is displaced from the blend tank as the new batch is charged. Step 5 involves the transfer of finished functionalized product which is expected to contain less than 10 ppm H040.

Step 2 - Add water and H040 to BTK-14.

Basis: The water/H040 charge to BTK-14 will occupy an equal volume of head space. The worse case assumption is that the blend tank vent is closed thus the free volume of BTK 14 will quickly reach equilibrium conditions and the BTK-14 head space will become saturated with H040. The saturated head space is released to the TO header following charging.

Worse case H040 charge, lbs	627	
Worse case H040 charge, ft^3	12.5	(specific gravity - 0.801)
Worse case water charge, lbs	627	
Worse case water charge, ft^3	10.0	
Total displacement, ft^3/batch	22.6	
Total BTK-14 volume, gallons	5,610	(design value)
Total BTK-14 volume, ft^3	750.0	
Total reactor batch volume, gallons	5,100	(design value)
Total reactor batch volume, ft^3	681.8	
Available headspace in BTK-14 (V), ft^3	68.2	
System temperature (T), K	333	(blend tank temp. 60 C)
Initial system pressure, mmHg	760	(BTK-14 is at ambient pressure before H040 addition)
Pressure increase H040 add, mmHg	11.4	(blend tank vent to TO is closed)
Equilibrium vapor press H040, mmHg	630	(physical data given)
Total system pressure (P), mmHg	1,401	

Calculate total number of lb moles of vapor in BTK-14 headspace

n = (P x V) / (R x T) n = lb-moles vapor in headspace
R = 998.97 mmHg·ft^3/lb mol·K

n = 0.29 lb-moles (total vapor)

Calculate vapor phase mole fraction of VOC (as H040) in total headspace vapor

yi = p_{eq} / p p_{eq} = equilibrium pressure of H040 at system temp., 630 mmHg
p = 760 mmHg

yi = 0.83 mol H040/mol total vapor vented

Calculate uncontrolled VOC (as H040) emission rate for Step 2

Er = yi x n x MW MW = molecular weight of H040, 57 lb/lb-mol

Er = 13.6 lbs VOC / batch

Step 3 - Nitrogen purge of water/H040 line into BTK-14.

Basis: The water/H040 is purged with nitrogen (25 cfm for 4 minutes) following each batch. Emissions of VOC (as H040) will be contained in the displaced nitrogen. The displaced nitrogen will be assumed to be saturated with H040 at the system (i.e., the water/H040 supply line) temperature and pressure.

System temperature (T), K	333	(blend tank temp, 60 C)
System pressure (pt), mmHg	760	(BTK-14 is at ambient pressure, 14.7 psia)
Rate of displacement, cfm	25	
Total displacement (V), ft^3/batch	100	

Calculate vapor phase mole fraction of H040

yi = (xi x pi) / pt xi = liquid phase mole fraction
pi = vapor pressure of VOC (H040) at system temp., 750 mmHg

blend tank batch will contain up to 150 ppm free organics (as H040)

blend tank contents	42,800	lbs
H040 content	6.42	lbs
moles of H040	0.113	lb-moles (based on MW = 57)
Total moles	1,377	lb-moles

xi (H040) = 8.2E-05

yi 8.07E-05

Calculate uncontrolled VOC (as H040) emission rate for Step 3

Er (yi x V x pt x MW) / (R x T) MW molecular weight of H040, 57 lb/lb-mol
R = universal gas constant, 998.97 mmHg ft^3/lb-mol K

Er = 0.0011 lbs VOC (as H040) / batch

Step 4 - Blend/hold contents of BTK-14 to reduce H040 concentration.

Basis: The functionalized batch in BTK-14 is held for a period of time to complete the reaction thereby reducing the concentration of free H040 to within acceptable limits. Emissions of H040 are based on the worse case assumption that the blend tank headspace becomes saturated with H040. Blend tank vent to TO is open.

Available headspace in BTK-14 (V), ft^3	68.2	
System temperature (T), K	324	(blend tank temp, 51 C)
Equilibrium vapor press of H040, mmHg	436	(physical data given)
Total system pressure (P), mmHg	436	

Calculate total number of lb-moles of vapor in BTK-14 headspace

$n = (P \times V) / (R \times T)$ n = lb-moles vapor in headspace

R = 998.97 mmHg-ft^3/lb mol-K

n = 0.09 lb-moles (total vapor)

Calculate vapor phase mole fraction of VOC (as H040) in total headspace vapor

$yi = p_{eq} / p$ p_{eq} = equilibrium pressure of H040 at system temp., 436 mmHg

p = 760 mmHg

yi = 0.57 mol H040/mol total vapor vented

Calculate uncontrolled VOC (as H040) emission rate for Step 4

$Er = yi \times n \times MW$ MW = molecular weight of H040, 57 lb/lb-mol

Er = 3.0 lbs VOC / batch

Total uncontrolled VOC from production of one batch

Er = 16.6 lbs VOC (as H040) / batch

Total controlled VOC from production of one batch (assumes 95 pct. catalytic TO efficiency)

Er = 0.83 lbs VOC (as H040) / batch

Projected functionalized emulsion product production

2,630,000 lbs/yr

63 batches/yr (based on nominal 42,000 lbs/batch)

Total uncontrolled VOC from functionalized emulsion product production

Er = 1,038 lbs VOC (as H040) / year

Total controlled VOC from functionalized emulsion product production

Er = 52 lbs VOC (as H040) / year